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wherein said timing-information insertion unit inserts the timing information into the training symbol sequence by changing the phase between adjacent training symbols and the device on the subscriber side detects a phase-change point in the training symbol sequence and adopts a timing which is a set time before or a set time after the phase-change detection time, as the start timing of said interval.

19. - 20. (canceled)

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21. (previously presented) The apparatus according to claim 18, wherein said timing-information insertion unit varies by 90° or 180° the phase of adjacent symbols constructing a training symbol sequence.

22. (previously presented) A digital subscriber line transmission system for transmitting downstream data from a device on an office side to a device on a subscriber side and upstream data from the device on the subscriber side to the device on the office side over a single line by switching between these data transmissions in time-division fashion, dividing data of one symbol, modulating carrier waves having different frequencies by each item of divided data and frequency-multiplexing the modulated signals, and transmitting the frequency-multiplexed signals in bursts a few symbols at a time, said system comprising:

a cable to accommodate said line as a first line and another line as a second line on which transmission of downstream data and transmission of upstream data are performed in time-division fashion;

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a training-symbol transmitting unit to transmit a training symbol via said first line at time of training carried out prior to data communication; and

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a training-symbol receiving unit to receive a training symbol via said first line;
said training-symbol transmitting unit including:

a timing-information insertion unit to insert timing information, which specifies an interval in which effects of crosstalk from said second line are received, into a training symbol sequence at time of training carried out prior to data communication; and

a transmitting unit to transmit the training symbol sequence into which the timing information is inserted from the device on the office side to the device on the subscriber side wherein the subscriber side determines a transmit interval for the upstream data and a receive interval for the downstream data based on the timing information; and

said training-symbol receiving unit includes:

a timing information extraction unit to extract the timing information from the training symbol sequence; and

a processor to execute training processing based upon this timing information,

wherein said timing-information insertion unit inserts the timing information into the training symbol sequence by changing the phase between adjacent training symbols and said timing information extraction unit detects a phase-change point in the training symbol sequence and adopts a timing which is a set time before or a set time after the phase-change detection time, as the start timing of said interval in which effects of crosstalk from said second line are received.

23. - 24. (canceled)

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25. (currently amended) A digital subscriber line transmission apparatus in a digital subscriber line transmission system for transmitting downstream data from a device on an office side to a device on a subscriber side and upstream data from the device on the subscriber side to the device on the office side over a single line by switching between these data transmissions in time-division fashion, dividing data of one symbol, modulating carrier waves having different frequencies by each item of divided data and frequency-multiplexing the modulated signals, and transmitting the frequency-multiplexed signals in bursts a few symbols at a time, said apparatus comprising:

a timing-information insertion unit to insert timing information, which specifies an interval in which effects of crosstalk from a neighboring line are received, in a training symbol sequence at a time of training carried out prior to data communication; and

a transmitting unit to transmit the training symbol sequence in which the timing information is incorporated from the device on the office side to the device on the subscriber side,

wherein the timing-information insertion unit inserts the timing information into the training symbol sequence to create a phase-change point by varying the phase of training symbols, and a time which is a set time before or a set time after the phase-change point is regarded as the start of said interval.

26. (previously presented) A digital subscriber line transmission system for transmitting downstream data from a device on an office side to a device on a subscriber side and upstream data from the device on the subscriber side to the device on the office side over a single line by

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switching between these data transmissions in time-division fashion, dividing data of one symbol, modulating carrier waves having different frequencies by each item of divided data and frequency-multiplexing the modulated signals, and transmitting the frequency-multiplexed signals in bursts a few symbols at a time, said system comprising:

a cable to accommodate said line as a first line and another line as a second line on which transmission of downstream data and transmission of upstream data are performed in time-division fashion;

a training-symbol transmitting unit to transmit a training symbol via said first line at a time of training carried out prior to data communication; and

a training-symbol receiving unit to receive a training symbol via said first line;

said training-symbol transmitting unit including:

a timing-information insertion unit to insert timing information, which specifies an interval in which effects of crosstalk from said second line are received, into a training symbol sequence at a time of training carried out prior to data communication; and

a transmitting unit to transmit the training symbol sequence into which the timing information is inserted from the device on the office side to the device on the subscriber side; and

said training-symbol receiving unit including:

a timing-information extraction unit to extract the timing information from the training symbol sequence; and

a processor to execute training processing based upon the timing information,

wherein said timing-information insertion unit inserts the timing information into the training symbol sequence to create a phase-change point by varying the phase between adjacent

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training symbols, and said timing-information extraction unit detects said phase-change point and adopts a time which is a set time before or a set time after the phase-change point as the start of said interval in which effects of crosstalk from the second line are received.

27. – 34. (canceled)

35. (previously presented) A TDD-digital subscriber line transmission method for transmitting downstream data from a device on an office side to a device on a subscriber side and upstream data from the device on the subscriber side to the device on the office side over a single line by switching between these data transmissions in time-division fashion, dividing data of one symbol, modulating carrier waves having different frequencies by each item of divided data and frequency-multiplexing the modulated signals, and transmitting the frequency-multiplexed signals in bursts a few symbols at a time, said method comprising the steps of:

incorporating timing information, which specifies an interval in which effects of crosstalk from a neighboring ISDN ping-pong transmission line are received, in a training symbol sequence at time of training carried out prior to data communication; and

transmitting the training symbol sequence in which the timing information is incorporated from the device in the office side to the device on the subscriber side wherein the subscriber side determines a transmit interval for the upstream data and a receive interval for the downstream data based on the timing information,

wherein the timing information is incorporated in the training symbol sequence by changing the phase between adjacent training symbols during a transmit interval of the ISDN ping-pong transmission as a FEXT interval by the device on the office side and a phase-change

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point in the training symbol sequence is detected by the device on the subscriber side and a timing which is a set time before or a set time after the phase-change detection time is adopted as the start timing of said interval, and

wherein a carrier wave of a predetermined frequency is quadrature modulated and the phase between adjacent symbols obtained by quadrature modulation is varied by 90° or 180° .

36. (currently amended) A TDD-digital subscriber line transmission apparatus in a TDD-digital subscriber line transmission system for transmitting downstream data from a device on an office side to a device on a subscriber side and upstream data from the device on the subscriber side to the device on the office side over a single line by switching between these data transmissions in time-division fashion, dividing data of one symbol, modulating carrier waves having different frequencies by each item of divided data and frequency-multiplexing the modulated signals, and transmitting the frequency-multiplexed signals in bursts a few symbols at a time, said apparatus comprising:

timing-information insertion means for inserting timing information, which specifies an interval in which effects of crosstalk from a neighboring ISDN ping-pong transmission line are received, into a training symbol sequence at time of training carried out prior to data communication; and

transmitting means for transmitting the training symbol sequence, into which the timing information has been inserted, from the device on the office side to the device on the subscriber side wherein the subscriber side determines a transmit interval for the upstream data and a receive interval for the downstream data based on the timing information,

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wherein said timing-information insertion means inserts the timing information into the training symbol sequence by changing the phase between adjacent training symbols during a transmit interval of the ISDN ping-pong transmission as a FEXT interval and the device on the subscriber side detects a phase-change point in the training symbol sequence and adopts a timing which is a set time before or a set time after the phase-change detection time, as the start timing of said interval, and

wherein said timing-information insertion means quadrature-modulates a carrier wave of a predetermined frequency and varies by 90° or 180° the phase of adjacent symbols constructing a training symbol sequence.

37. (previously presented) A TDD-digital subscriber line transmission system for transmitting downstream data from a device on an office side to a device on a subscriber side and upstream data from the device on the subscriber side to the device on the office side over a single line by switching between these data transmissions in time-division fashion, dividing data of one symbol, modulating carrier waves having different frequencies by each item of divided data and frequency-multiplexing the modulated signals, and transmitting the frequency-multiplexed signals in bursts a few symbols at a time, said system comprising:

a cable to accommodate said line as a first line and a second line as an ISDN ping-pong transmission line on which transmission of downstream data and transmission of upstream data are performed in time-division fashion;

a training-symbol transmitting unit to transmit a training symbol via said first line at time of training carried out prior to data communication; and

a training-symbol receiving unit to receive a training symbol via said first line;

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said training-symbol transmitting unit including:

a timing-information insertion unit to insert timing information, which specifies an interval in which effects of crosstalk from said second line are received, into a training symbol sequence at time of training carried out prior to data communication; and

a transmitting unit to transmit the training symbol sequence into which the timing information is inserted from the device on the office side to the device on the subscriber side wherein the subscriber side determines a transmit interval for the upstream data and a receive interval for the downstream data based on the timing information; and

said training-symbol receiving unit includes:

a timing information extraction unit to extract the timing information from the training symbol sequence; and

a processor to execute training processing based upon this timing information,

wherein said timing-information insertion unit inserts the timing information into the training symbol sequence by changing the phase between adjacent training symbols during a transmit interval of the ISDN ping-pong transmission as a FEXT interval and said timing information extraction unit detects a phase-change point in the training symbol sequence and adopts a timing which is a set time before or a set time after the phase-change detection time, as the start timing of said interval in which effects of crosstalk from said second line are received, and

wherein said timing-information insertion unit quadrature-modulates a carrier wave of a predetermined frequency and varies by 90° or 180° the phase of adjacent symbols constructing a training symbol sequence.

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